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COMPETENCE OF THE MATHEMATICS TEACHERS ON OUTCOMES-BASED EDUCATION: BASIS FOR AN INTERVENTION PROGRAM

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1. ABSTRACT

The quality of Philippine education was declining and that the teachers were the heart of the problem. The study aimed to assess the competence of the Mathematics teachers on Outcomes-Based Education (OBE), as a basis in the formulation of an intervention program. The study was a descriptive correlation utilizing a universal sampling technique. Analysis of Variance, t-test, and Pearson's r coefficient correlation were used in the analysis of competencies.

Results revealed that the majority of the respondents belong to 21-35 years old age bracket, with a limited number of seminars and training attended, and having12 years of professional teaching experience. The competence of the respondents in their knowledge was very satisfactory, posing with a positive attitude, and moderately practiced Outcomes-Based Education system in their instruction.

There was a significant difference in the competence of the teachers on their knowledge, and attitude on Outcomes-Based Education, when they were grouped according to their attendance in seminars and training. Attendance to seminars and training which were OBE-related has a bearing on the competency level of knowledge and attitude of the Mathematics teachers. The higher the level of competence on the knowledge of the teachers, the more positive was their attitude, and the greater their practices on Outcomes-Based Education. A proposed intervention program was formulated as the output of the study for implementation.

KEYWORDS: competence, attitude, Cebu Technological University, knowledge, instruction, practices

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Original Article

2. INTRODUCTION TO THE STUDY

The Congressional Commission to Review (CCR) and Assess Philippine Education (EDCOM) had come out with the finding that the "quality of Philippine education is declining" and that the teachers are "at the heart of the problem" (Bilbao et al., 2006). Quality education can be attained if the teachers and students are of good quality (Salandanan, 2007). Education is aimed at creating teaching and learning environments that would bring about desired changes in learners, whether to be more knowledgeable, better skilled or to influence their attitudes and values positively.

To address the demands and challenges of an international community, as well as the universal demand for quality education and to address global demands of economies in the 21st century, the Philippines have been implementing educational reforms such as in basic education, the universalization of kindergarten, the mother-tongue based education in the early years, and the Senior High School (SHS) are applied. In higher education, the State Universities and Colleges (SUCs) have shifted from an inputs-based to an outcomes-based education (OBE),

thus placing the students in the center of all educational planning.

Spady (1994) defines OBE as a comprehensive approach to organizing and operating an education system that is focused on and defined by the successful demonstrations of learning sought from each student. Outcomes-Based Education [OBE] is currently favored internationally to promote educational renewal and has been implemented in countries such as Canada, the United States and New Zealand (Malan, 2000), and the Philippines is also implementing this in the educational system. Outcomes are clear learning results that we want students to demonstrate at the end of significant learning experiences and are actions and performances that embody and reflect learner competence in using content, information, ideas, and tools successfully.

According to Bilbao (2013), Outcomes-Based Education can be seen from three views. First, as a theory in education, these are sets of beliefs and assumptions about teaching and learning. Second, as a system of education, this refers to the systemic structure of education that follows a pattern of inputs, processes and outputs. And third, as a classroom practice, such as planning, implementing and evaluating to make sure that learning happens and that the desired learning results or outcomes are achieved. Relating to the Mathematics teacher's role in the effective implementation of OBE, this pertains to their competence which includes their knowledge, attitude, and practices (KAP).

Every teacher, specifically Mathematics instructor shall uphold the highest possible standards of quality education, shall make the best preparation for the career of teaching, and shall be at his best at all times in the practice of his profession as stated in Article IV, Section 2 of the Code of Ethics of Professional Teachers. The most important factor affecting the quality of education is the quality of the individual teacher in the classroom. Regardless of the resources that are provided, rules that are adopted and curriculum that is revised, the primary source of learning for students' remains on the classroom teacher.

Cebu Technological University (CTU) is an institution transformed and committed to preserving high quality academic and technological excellence. It is also committed to environmental concerns and ecology as offshoots of scientific and technological advances in the world of industrialization. With the exemplar of expanding the University's jurisdiction and curricular offerings, the philosophy of providing quality higher technological, professional instructions in science and technology, agriculture, fishery, and industrial technical courses come into existence.

In compliance with the Commission on Higher Education (CHED) Memorandum Order Number 46, series 2012 entitled "Policy Standard to Enhance Quality Assurance (QA) in Philippine Higher Education through Outcomes-Based and Typology Based QA", CTU is undertaking some activities pertaining to Outcomes-Based Education which started last 2015, faculty members were required to attend orientations and training on Outcomes-Based Teaching Learning Strategies, Planning, and Assessment. Teachers were starting to prepare the OBE documents but the totality of the involvement of faculty members and their competence in terms of knowledge, attitude, and practices are neither being assessed nor evaluated.

It is in this context that this study is conducted to assess the competence of the Mathematics teachers on the Outcomes-Based Education in Mathematics instruction of the Cebu Technological University Campusesso that the result can be used as the basis in the formulation of an intervention program.

3. METHODOLOGY

3.1. Study Area

The study was conducted at the nine (9) Campuses of the Cebu Technological University (CTU)–System. Cebu Technological University System, with its Main Campus, is an educational institution located at MJ Cuenco Avenue corner R. Palma Street, Cebu City, Philippines. The State University, previously named Cebu State College of Science and Technology (CSCST) was converted through Republic Act (RA) 9744 under the governance of President Gloria Macapagal Arroyo on November 10, 2009.

The different CTU campuses are formerly named and is located in the following respective places : From the Southern Part - (1) Agro-Industrial and Forestry College in Argao town, (2) College of Agriculture in Barili town (previously located in Sudlon, Lahug of Cebu City), (3) College of Fisheries in Moalboal town; From the City - (4) College of Industrial Technology in Danao City, (5) College of Sciences, Arts and Trades in Cebu City; From the Northern Part - (6) Fishery and Industrial College in San Francisco, Camotes, town, (7) College of Fisheries Technology in Carmen town, (8) College of Fisheries in Daanbantayan town, and (9) Polytechnic College in Tuburan town.

CTU is an ISO 9001:2015 certified institution conducted by the TUV Rhineland, an International Certification body and the institution was awarded as Level IV among State Universities and Colleges (SUC) levelling in the country. The CTU official Web site is http://www.ctu.edu.ph/and online courses are at http://www.ctu-online.edu.ph.

The location of the campuses serves as basis in grouping the respondents as to their demographic profile as to age, seminars and trainings attended, and the number of years in professional experience.

3.2. Methods

The study utilized the descriptive correlation method in gathering the data to assess the competence based on the knowledge, attitude, and practices of the Mathematics instructors on their use, feelings, beliefs, and application of the Outcomes-Based Education (OBE). The difference between the competence of the respondents when grouped as to their age, seminars and training attended, and the number of years in professional experience in their demographic profile was determined as well as the relationship of the competence on knowledge, attitude, and practices on OBE by the instructors of the CTU Campuses.

A descriptive design is aimed at describing what is and not trying to determine or infer any causal relationships (Borg & Gall, 1989). In a descriptive study, summary data can be reported using measures like mean, median, standard deviation, variation and correlation between variables, as well as other empirical data (The Handbook of Research for Educational Communications and Technology, 2001). Considering the nature of the study, where correlation of two objectively measurable variables is involved, the descriptive-correlational research is identified as the most appropriate method.

3.3. Respondents

The study used the universal sampling technique in determining the Mathematics Instructors as the respondents of the study. The participants were the permanent and the part–time teachers in all of the nine (9) campuses of Cebu Technological University (CTU) System.

A total of 54 faculty members in all CTU–Campuses were considered as respondents. Out of the 54 respondents, 16 or 29.63 percent were coming from the main campus. Since there were more students who were enrolled, and offered more programs or courses as compared to other campuses.

3.4. Instrument

The researcher utilized an adapted questionnaire to gather the data needed in the study. There were two (2) parts of the questionnaire that was used in order to collect the pertinent information that were required to answer the specific questions in this research. The first part of the questionnaire contains the demographic profile of the Mathematics teachers which includes the age, seminars and trainings attended, and number of years in professional experience.

The second part aim to gather information on the competence of the Mathematics teachers on their knowledge, attitude, and practices of the Outcomes–Based Education (OBE). The competence was determined using the four–point Likert scale. The items or statements in this part of the questionnaire were adapted from Ortega and Dela Cruz (2016).

3.5. Data Analysis

Analysis of Variance (ANOVA) and t-test for independent samples were used to determine the difference between the competence of the Mathematics teachers on their knowledge, attitude, and practices when grouped according to their age, number of professional experience, and attendance to seminars and training.

Pearson's Coefficient Correlation was used to test if there was a significant relationship between the teachers' competence in their knowledge, attitude, and practices on OBE in Mathematics instruction. The Pearson's r is a measure of the strength of the relationship between two variables (Mukaka, 2012). Pearson's r was used to test the association between two variables, as one variable increases, the other variable tends to increase or decrease.

4. RESULTS AND DISCUSSION

4.1. Demographic Profile of the Respondents

Age. The City Campuses with a total of 20 teachers has the highest number of Mathematics faculty members that belongs to the age range of 21–35 years old (f=20) having a 22.22 percent and obtains also the lowest number of teachers (f=4) of 7.41 percent with age range of 36–49 years old (Table 1).

Meanwhile, the South Campuses with 16 total number of teachers has the lowest number of faculty members (f=4) with age range of 21–35 years old which is equal to 7.41 percent and obtains also the highest number of Mathematics teachers (f=8) with age range of 36-49 years old which is equivalent to 14.81 percent. All the three (3) Campuses (South, City, and North) have the same number of faculty members (f=4) with age ranges from 50 to 64 years old.

Table 1: Age Profile of the Mathematics Faculty Members

Age (in years) Campuses	N	21-35		36-49		50–64		Mean Age
		f	%	f	%	f	%	
1. South	16	4	7.41	8	14.81	4	7.41	42.00
2. City	20	12	22.22	4	7.41	4	7.41	34.35
3. North	18	9	16.67	5	9.26	4	7.41	38.61
Total	**54**	**25**	**46.30**	**17**	**31.48**	**12**	**22.22**	**38.04**

In totality, of all the 54 Mathematics teachers from the 9 Campuses of the Cebu Technological University System, 25 or 46.30 percent are in the age range of 21–35 years old, 17 or 31.48 percent belongs to 36–49 years old, and 12 or 22.22 percent are having age range of 50–64 years old. The 20 teachers from the City Campuses had the lowest mean age of 34.35 years old followed by the 18 faculty members from the North Campuses with a mean age of 38.61 years old, while the 16 Mathematics teachers from the South Campuses has the highest mean age of 42.00 years old. The mean age of all the respondents is 38.04 years old.

Most of the Mathematics faculty members in the CTU–System Campuses are in the middle–aged adulthood age bracket based on Erik Erikson eight stages of psychosocial development. This stage with age ranges from 35–55 years old has broad application to family, relationships, work, and society. The concept of generativity is the main concern in the middle–aged adulthood age bracket and is meant to include productivity and creativity.

Central tasks of middle–aged adulthood individuals includes; Express love through more than sexual contacts, Maintain healthy life patterns, Develop a sense of unity with mate, Help growing and grown children to be responsible adults, Relinquish central role in the lives of grown children, Accept children's mates and friends, Create a comfortable home, Be proud of accomplishments of self and mate/spouse, Reverse roles with aging parents, Achieve mature, civic and social responsibility, Adjust to physical changes of middle age, and use leisure time creatively.

Career and work are the most important things at this stage, along with family. Middle–aged adulthood is also the time when people can take on greater responsibilities and control. For this stage, working to establish stability and the idea of generativity – attempting to produce something that makes a difference to society. Inactivity and meaninglessness are common fears during this stage. Major life shifts can occur during this stage. Significant relationships are those within the family, workplace, local church, and other communities.

Seminars and Training Attended. There were nine (9) or 16.67 percent of the faculty members from the South and North campuses who attended seminars and training on OBE and only five (5) or 9.26 percent from the City campuses (Table 2). There were 15 or 27.78 percent participants who attended in the regional level, five (5) or 9.26 percent in the national level, and only three (3) or 5.56 percent in the international level. Of the 54 respondents there were 23 or 42.59 percent participated in seminars and training which were related to OBE and there were 31 or 57.41 percent who were not able to attend seminars and training on OBE.

This indicates that lesser opportunity in participating seminars, and training were experienced by the respondents. As verified by the researcher through interview on the reasons why it is only few faculty members have attended seminars or

training on OBE, the Mathematics teachers responded that the main reason is that there was no memorandum or invitation being received by the faculty to attend a particular seminar, training or workshop. Limited number of seminars and training on outcomes – based education was participated in by the Mathematics teachers.

Table 2: Profile of Seminars and Training Attended by the Mathematics Faculty on OBE

Level Campuses	N	*No Seminar*		Regional		National		International		Total	
		f	*%*	f	%	f	%	f	%	f	%
1. South	16	*7*	*12.95*	5	9.26	2	3.70	2	3.70	9	16.67
2. City	20	*15*	*27.78*	2	3.70	2	3.70	1	1.85	5	9.26
3. North	18	*9*	*16.67*	8	14.81	1	1.85	0	0.00	9	16.67
Total	**54**	***31***	***57.41***	**15**	**27.78**	**5**	**9.26**	**3**	**5.56**	**23**	**42.59**

Number of Years in Professional Experience. Table 3 reveals the profile on the number of years that the Mathematics faculty members have professional experience in teaching both from the CTU campus and other institutions. The three (3) ranges used are below 15 years, 15 to 27 years, and above 27 years. The highest and lowest number of years in professional experience among the teachers were 41 years and one (1) year respectively. There are 35 Mathematics faculty members or 64.81 percent having below 15 years of teaching experience, 13 or 24.07 percent with 15 to 27 years and six (6) teachers or 11.11 percent are having an experience of 28 to 41 years.

CTU – South Campuses has the highest number of faculty members (f=3, %=5.56) with experience of teaching above 27 years, CTU–City Campuses is having the highest percentage (31.48 percent) (f=20) of years in teaching experience below 15 years while CTU–North Campuses was also the highest in percentage (11.1 percent) (f=6) for 15 to 27 years of teaching experience. The faculty members from the CTU–City campuses has the lowest mean value of 8.15 years, followed by the CTU–North campuses with mean value of 13.94 years, while CTU–South campuses has the highest mean value of 14.56 years in their number of years in professional experience.

The number of years in professional experience of the respondents is directly related with the age of the teachers where in the teachers from the CTU–City campuses were the youngest in terms of mean age, followed by the CTU–North campuses, and the CTU–South campuses were the oldest. The greater the age of the faculty members, the higher it's number of years in professional experience and vice–versa. Likewise, the lesser the age of the teachers, the smaller its number of years in teaching. Most of the faculty members of the CTU–City campuses were young and part–time teachers.

In totality, the mean value of 11.98 years of teaching experience among the Mathematics faculty members in the CTU–System Campuses indicates that most of the teachers are employed during the early period of the 20th century.

Table 3: Number of Years in Professional Experience of the Mathematics Teachers

Experience (in years) Campuses	N	Below 15		15-27		Above 27		Mean Value
		f	%	f	%	f	%	
1. South	16	8	14.81	5	9.26	3	5.56	14.56
2. City	20	17	31.48	2	3.70	1	1.85	8.15
3. North	18	10	18.52	6	11.11	2	3.70	13.94
Total	**54**	**35**	**64.81**	**13**	**24.07**	**6**	**11.11**	**11.98**

4.2. Competence of the Mathematics Teachers on Outcomes – Based Education

Knowledge. As shown in Table 4, the mean scores of all the ten (10) statements pertaining to the competence of the respondents in terms of their knowledge on outcomes-based education are within the ranges from 2.50 to 3.49 which belongs to a very satisfactory competence on OBE. The grand mean of 2.70 indicates that the respondents are having very satisfactory competence which means that the Mathematics teachers are very knowledgeable on OBE.

Table 4: Competence of Mathematics Teachers on their Knowledge of Outcomes–Based Education (OBE) in Mathematics Instruction

Statements	SD	M	D
1. I explain to the students' what outcomes – based teaching and learning is all about.	.62	2.72	VS
2. I define the Course Intended Learning Outcomes (CILOs) to the students.	.66	2.70	VS
3. I can properly explain the CILOs to the students.	.61	2.74	VS
4. I can identify the Teaching & Learning Activities (TLAs) that facilitates the achievement of CILOs.	.63	2.70	VS
5. I can identify the Assessment Tasks (ATs) that can be used to measure whether the students have achieved the CILOs.	.57	2.78	VS
6. I can monitor learners on their learning progress and achievements.	.58	2.76	VS
7. I am able to align the world of learning with the world of work.	.65	2.72	VS
8. I am able to facilitate an outcomes – based Mathematics class.	.62	2.63	VS
9. I am equipped to establish an OBE classroom climate, providing cooperative, well directed and purposeful activities.	.63	2.57	VS
10. I am able to create an environment where all learners can actively participate.	.60	2.69	VS
Grand Mean		2.70	VS

Note: *3.50-4.00 Outstanding Competence (OC); 2.50-3.49 Very Satisfactory Competence (VS); 1.50-2.49 Satisfactory Competence (SC); 1.00-1.49 Unsatisfactory Competence (UC)*

This very satisfactory level of competence of the Mathematics teachers in terms of their knowledge on outcomes–based education is second from the highest, so there's still a need for the Mathematics teachers to continue in the development of their knowledge to further increase or improve their competence up to the exceptional / outstanding level.

All the ten (10) statements pertaining to the knowledge of the Mathematics teachers on OBE resulted with standard deviation from .57 to .66, which described the homogeneity of the participants in every item. Moreover, the statement with the lowest mean of 2.57 states that "I am equipped to establish an OBE classroom climate, providing cooperative, well directed and purposeful activities", this was followed with a mean of 2.63 stating that "I am able to facilitate an outcomes–based Mathematics class, and the third was with a mean of 2.69 which is "I am able to create an environment where all learners can actively participate".

From the result, it can be gleaned that the teachers still require the competence on establishing, facilitating, and creating an OBE Mathematics class / environment. As the concept of OBE states that the teachers are facilitators of learning and the students being at the center of the learning process (Biggs and Tang, 2011).

The findings of the study implied that activities geared towards the attainment of teachers' knowledge on outcomes–based education to outstanding competence can be done to give focus on the knowledge of the following: establishing an OBE classroom climate, providing cooperative, well directed and purposeful activities, facilitating an outcomes–based Mathematics class, creating an environment where all learners can actively participate, identifying the Teaching and Learning Activities (TLAs) that facilitates the achievement of CILOs, defining the Course Intended Learning Outcomes (CILOs) to the students, explaining to the students what outcomes – based teaching and learning is all about, aligning the world of learning with the world of work, explaining the CILOs to the students, monitoring learners on their learning progress and achievements, and identifying the Assessment Tasks (ATs) that can be used to measure whether the students have achieved the CILOs.

Moreover, Salandanan (2001) believes that a teacher is expected to be knowledgeable about the subject he is supposed to teach. He must possess not only substantial knowledge but deeper and more advanced in order to be able to teach with confidence and accuracy.

Attitude. Table 5 presents that out of the ten (10) statements on the competence of the Mathematics teachers that pertains to their attitude towards outcomes–based education, three (3) of which the respondents are having outstanding competence (highly positive attitude). These statements with mean scores that are within the ranges of 3.50 to 4.00 are the following: I believe that OBE approach to Math class prepares the students' better for the workplace.; I believe that OBE allows me to be more flexible in employing variety of teaching methods in Mathematics class.; and I believe that participation to seminars and training on OBE enhances my ability to be a good Mathematics professor.

The grand mean of 3.40 which indicates the very satisfactory competence describes that the respondents are having positive attitude on outcomes–based education. This competence of the teachers pertaining to their attitude towards OBE is second from the maximum / highest status, so there's still a room for improvement for the Mathematics teachers' attitude to further attain a highly positive attitude or outstanding competence towards OBE.

There are ten (10) statements which relate to the attitude of the Mathematics teachers on OBE. All the items resulted with standard deviation from .50 to .64, which described the homogeneity of the participants in every item. The seven (7) remaining statements resulted with mean scores which ranges from 2.50 to 3.49 which indicates very satisfactory status on the competence of the teacher's attitude, it implies that the faculty members are having positive attitude towards the implementation of OBE in Mathematics instruction.

Additionally, activities can be formulated and implemented to enhance the status of the teachers' attitude on these statements such as: OBE approach to Mathematics class requires every professor to be a specialist in her/his subject field, OBE provides the teacher with an opportunity to ensure that all learners achieve success, OBE approach provides all Mathematics students with equal educational opportunities, OBE raises the standards of students' academic achievements in Mathematics, OBE approach to Mathematics, teaching-learning process is enjoyable and interesting, OBE approaches require greater responsibilities from Mathematics Professors than content driven approaches, and OBE approach to learning develops students' leadership and management skills.

Mathematics teachers are amenable to be sent to participate in seminars and trainings on OBE that enhances their ability to be a good Mathematics professor; also through OBE they were supportive to be more flexible in employing variety of teaching methods in their Mathematics class which prepares the students' better for the workplace.

The findings of this study are supported by the result of the researches conducted by Dela Cruz (2017) on the Educators' Attitude towards Outcomes – Based Information Technology Education in the Philippines and Ortega (2016) on the Educators' Attitude towards Outcomes Based Educational Approach in English Second Language Learning. It was found out in their studies that teachers were having positive attitude towards OBE. In addition, result of the study conducted by Borsoto et al. (2014) showed that faculty and students believed that OBE is useful in terms of academics, attitude, and instructions.

Table 5: Competence of Mathematics Teachers on their Attitude towards Outcomes–Based Education (OBE) in Mathematics Instruction

Statements	SD	M	D
1. I believe that OBE approach to Math class prepares the students' better for the workplace.	.54	3.52	OC
2. I believe OBE raises the standards of students' academic achievements in Math.	.51	3.35	VS
3. I believe that an OBE approach to learning develops students' leadership and management skills.	.53	3.41	VS
4. I believe that OBE allows me to be more flexible in employing variety of teaching methods in Mathematics class.	.50	3.54	OC
5. I believe that OBE approach provides all Math students with equal educational opportunities.	.54	3.31	VS
6. I believe that OBE approaches require greater responsibilities from Mathematics Professors than content driven approaches.	.56	3.41	VS
7. I believe that with OBE approach to Mathematics, teaching-learning process is enjoyable and interesting.	.59	3.39	VS
8. I believe that participation to seminars and training on OBE enhances my ability to be a good Mathematics professor.	.53	3.54	OC
9. I believe that OBE approach to Mathematics class requires every professor to be a specialist in her/his subject field.	.64	3.24	VS
10. I believe that OBE provides me with an opportunity to ensure that all learners achieve success.	.59	3.28	VS
Grand Mean		3.40	VS

Note: *3.50-4.00 Outstanding Competence (OC); 2.50-3.49 Very Satisfactory Competence (VS); 1.50-2.49 Satisfactory Competence (SC); 1.00-1.49 Unsatisfactory Competence (UC)*

Practices. As revealed in table 6, all the ten (10) statements concerning on the practices implemented by the Mathematics teachers on OBE resulted with standard deviation between .42 to .77, which described the homogeneity of the participants responses in every item while the mean values which ranges from 2.50 to 3.49 denotes a very satisfactory level of competence. The grand mean of 2.99 which specifies the very satisfactory competence indicates that the respondents has practiced OBE moderately adequate. This competence of the teachers pertaining to their practices on the implementation of OBE is second from the highest level, so there's still an opportunity for the enhancement of the practices of teachers on OBE in Mathematics instruction up to the outstanding competence where practices on OBE are very adequate.

From the ten (10) statements on the practices of the teachers on OBE, there were two (2) items having the same mean of 2.67 which is the lowest stating that "I have the available resources to present Mathematics lessons using OBE approach and I have participated appropriate seminars and training in OBE.

The result implies that facilities and equipment (resources) which are needed in the Mathematics classroom for the implementation of OBE approach in teaching and learning were inadequate, thus procurement of this resources be given priority by the administrators or the middle managers who were the direct supervisors of the teachers. Moreover, attendance of the teachers on OBE seminars and trainings be included in the faculty development plan as one of the components in the capability building of Mathematics faculty member.

From the foregoing, it entails that the teachers are still deficient on their practices towards the implementation of OBE in Mathematics instruction. Measures to enhance the teachers' on the following OBE related practices should also be considered: large classes (40 or more students per group) hinder the successful implementation of OBE, teachers concern in OBE approach to Mathematics learning enhances their ability to be good facilitators, experiences in teaching help the teachers to adapt an OBE approach to Mathematics learning, OBE approach motivates the teachers to do sufficient preparation in their Mathematics class, perform subject–related reading to enhance teachers knowledge and understanding of OBE approaches, employing OBE approach than content driven approach in Mathematics classes, schedule allows for sufficient preparation time of OBE approaches, and colleagues support co-teachers with ideas when using OBE approach.

Table 6: Competence of Mathematics Teachers on their Practices on Outcomes–Based Education in Mathematics Instruction

Statements	SD	M	D
1. My daily schedule allows for sufficient preparation time of OBE approaches.	.63	2.83	VS
2. I have the available resources to present Mathematics lessons using OBE approach.	.58	2.67	VS
3. My experiences in teaching help me to adapt an OBE approach to Math learning.	.42	3.17	VS
4. I perform subject – related reading to enhance my knowledge and understanding of OBE approaches.	.50	3.07	VS
5. I have participated appropriate seminars and training in OBE.	.77	2.67	VS
6. My colleagues support me with ideas when using OBE approach.	.52	2.80	VS
7. I am employing OBE approach than content driven approach in Mathematics classes.	.57	2.93	VS
8. OBE approach motivates me to do sufficient preparation in my Math class.	.51	3.13	VS
9. My concern in OBE approach to Mathematics learning enhances my ability to be a good facilitator.	.46	3.17	VS
10. Large classes (40 or more students per group) hinder the successful implementation of OBE.	.53	3.43	VS
Grand Mean		2.99	VS

Note: *3.50-4.00 Outstanding Competence (OC); 2.50-3.49 Very Satisfactory Competence (VS); 1.50-2.49 Satisfactory Competence (SC); 1.00-1.49 Unsatisfactory Competence (UC)*

4.3. Difference on the Competence of the Teachers on OBE in Mathematics Education in terms of Knowledge, Attitude, and Practices when grouped according;

Age.As shown in table 7, the ANOVA results reveal that there is no significant difference in the Mathematics teacher's competence on outcomes–based education in terms of knowledge when grouped according to age, F (2,51) = .449, p = .641. Thus, there was no significant difference exists in the teachers' competence on OBE in their knowledge when grouped according to their age. In terms of teacher's competence on OBE based on their attitude, ANOVA results also reveal that there was no significant difference in the Mathematics teacher's competence on outcomes-based education in terms of attitude when grouped according to age, F(2, 51) = .425, p = .656. Moreover, the ANOVA results reveal that there was no significant difference in the Mathematics teacher's competence on outcomes–based education in terms of practices when grouped according to age, F (2,51) = .338, p = .755.

There was no significant difference on the competence of the teachers on OBE in Mathematics Education in terms of knowledge, attitude, and practices when they were grouped according to age. Mathematics teachers' competence in their knowledge, attitude, and practices on the OBE does not change as age varies. This means that regardless of the teachers' age, their competencies on Outcomes Based Education were more or less similar. Young, middle age adulthood, and adult teachers were having similar competence in their knowledge, attitude, and practices on OBE.

The result of this study was supported by the study of Peñalosa (2011), in her study on the Administrators' Supervisory Competence and Teachers Performance in the Division of Tacloban City: Improved Management Plan, she found out that age was not significantly correlated with level of teaching performance.

However, this result was in contradiction with the findings on the study of Galeon et al. (2009), it was found out that as the age of the faculty members of the University of San Jose Recoletos increases, the performance or competencies of the teachers' decreases, which indicates that competencies of teachers differ as the age changes with time.

Table 7: ANOVA Results Showing Significance of Differences on the Competence of the Mathematics Teachers on OBE in terms of Knowledge, Attitude, and Practices when Grouped according to Age

Category	Sum of Squares	df	Mean Square	F	p-value
Competence of the Teachers on OBE					
Knowledge					
Between Groups	.187	2	.094	.449	.641
Within Groups	10.642	51	.209		
Total	10.829	53			
Attitude					
Between Groups	.146	2	.073	.425	.656
Within Groups	8.784	51	.172		
Total	8.930	53			
Practices					
Between Groups	.077	2	.039	.338	.755
Within Groups	5.811	51	.114		
Total	**5.888**	**53**			

4.4. Difference on the Competence of the Teachers on OBE in Mathematics Education in terms of Knowledge, Attitude, and Practices when Grouped according to Seminars and Training Attended.

As shown in table 8, the results of the t-test of independent samples reveal that there was a significant difference on the competence of the teachers on OBE in Mathematics education in terms of knowledge when grouped according to the seminars and training attended, t (52) = 2.897, p = .006. Thus, the null hypothesis that no significant difference would exist in the teachers' competence on OBE in their knowledge when grouped according to their seminars and training attended, is rejected.

In terms of teacher's competence on OBE based on their attitude, t-test result also reveals that there was a significant difference on the competence of the teachers on OBE in Mathematics education in terms of attitude when grouped according to the seminars and training attended, t (52) = 2.105, p = .040. The null hypothesis that no significant difference exists in the teachers' competence on OBE in their attitude when grouped according to their seminars and training attended, was not accepted.

On the other hand, the result shows that there was no significant difference in the Mathematics teacher's competence on Outcomes Based Education in terms of practices when grouped according to seminars and training attended, t (52) = 1.539, p = .130. This implies that there was no significant difference in the Mathematics teachers' competence on Outcomes Based Education in terms of practices when grouped according to the seminars and training attended, which means that more or less teachers had practiced OBE regardless of whether he has participated or not attended in seminars and training on OBE. Teachers resort to use their own practice to which they were more comfortable. To ensure that teachers have practice the learning gained from seminars and training attended, monitoring and evaluation as well as feed backing be strengthened and established.

Likewise, there was a significant difference in the Mathematics teachers' competence in outcomes–based education in terms of knowledge and attitude when grouped according to the seminars and training attended. The confidence intervals for the mean differences at 95% significant level indicate that the t-test output complement the significant test results. This implies that teachers who attended seminars and training were more knowledgeable and competent and having positive attitude towards outcomes–based education compared to those teachers with no attendance in seminars and training on OBE.

This result was supported with the findings on the study of Temelo (2013), it was found out that there's a significant difference in the competency of Mathematics teachers before and after the conduct of retraining. This emphasizes that attendance to training was a potent factor on Mathematics teachers' competencies.

In addition, this was also in consonance with the findings of Aziz and Akhtar (2014) in their study, trained teachers showed a significant difference in pedagogical competencies, management and assessment competencies and research competencies. It depicts that in all the categories' trained teachers were more competent than teachers having no training. It was concluded that trained teachers were more competent than teachers having no training. Training or professional development programs were required to enhance desired competencies and to polish required ones.

Table 8: T-test Results Showing Significance of Differences on the Competence of the Mathematics Teachers on OBE in terms of Knowledge, Attitude, and Practices when Grouped according to Seminars and Training Attended

Category	N	Mean	Mean Difference	df	t-value	p-value (2-tailed)	95% CI of the Difference	
							Lower	Upper
Competence of the Teachers in								
Knowledge								
Attended with Seminars, Training	23	2.8957	.3376	52	2.897**	.006	.5714	.1037
Not Attended with Seminars, Training	31	2.5581						
Attitude								
Attended with Seminars, Training	23	3.5304	.2304	52	2.105*	.040	.4501	.0108
Not Attended Seminars, Training	31	3.3000						
Practices								
Attended with Seminars, Training	23	3.0652	.1394	52	1.539	.130	.3211	.0423
Not Attended Seminars, Training	31	2.9258						

*Note: * sig at p< .05, ** sig at p< .01*

4.5. Difference on the Competence of the Teachers on OBE in Mathematics Education in terms of Knowledge, Attitude, and Practices when Grouped according to Number of Years in Professional Experience. As reflected in table 9, the ANOVA results reveal that there was no significant difference on the competence of the teachers on Outcomes Based Education in Mathematics Education in terms of knowledge when grouped according to number of years in professional experience, F (2, 51) = .795, p = .457. Thus, the null hypothesis that no significant difference exists in the teachers' competence on OBE in their knowledge when grouped according to their number of years in professional experience, was accepted. In terms of teacher's competence on OBE based on their attitude, ANOVA results also reveal that there was no significant difference in the Mathematics teacher's competence on Outcomes Based Education in terms of attitude when grouped according to number of years in professional experience, F (2,51) = 1.220, p = .304.

Moreover, the ANOVA results reveal that there was no significant difference in the Mathematics teacher's competence in outcomes – based education in terms of practices when grouped according to number of years of professional experience, F (2,51) = .062, p = .940. Thus, the null hypothesis that no significant difference exists in the teachers' competence in OBE in their practices when grouped according to their number of years in professional experience, was accepted.

There was no significant difference on the competence of the teachers on OBE in Mathematics Education in terms of their knowledge, attitude, and practices when they are grouped according to number of years in professional experience. Mathematics teachers' competence in their knowledge, attitude, and practices on the OBE does not change as number of years in professional experience increases or decreases. This means that regardless with the teachers' number of years in professional experience, their competencies on outcomes – based education were more or less comparable.

Findings on the studies of Jalandoni (2014) and Peñalosa (2011) support this result of the research, the result of the study conducted by Jalandoni (2014) reveals that there were no significant differences in the teachers' beliefs and values in teaching and learning perceived competence and in terms of Mathematics context and assessment tools, accountability, perceived parental demands and classroom assessment practices, and in terms of purpose, measurement, evaluation, and use when the teachers were classified according to length of teaching experience. Peñalosa found out that number of years in teaching was not significantly correlated with level of teaching performance.

This result contradicts with the notion of Rivera and Zambrano (1992), they consider that good teaching is no accident. All that happens in school depends upon what teachers and others wish to accomplish and upon skills and facilities for achieving what they desire. A good teacher is the product of long years of training and actual experience. No amount of book learning can make a teacher acquire craftsmanship in teaching without correctly putting into practice the principles and techniques which imbibed within lecture halls. As the craftsman learns by doing, so do with teachers, they learn by teaching.

Table 9: ANOVA Results Showing Significance of Differences on the Competence of the Mathematics Teachers on OBE in terms of Knowledge, Attitude, and Practices when Grouped according to Number of Years in Professional Experience

Category	Sum of Squares	df	Mean Square	F	p-value
Competence of the Teachers on OBE					
Knowledge					
Between Groups	.327	2	.164	.795	.457
Within Groups	10.502	51	.206		
Total	10.829	53			
Attitude					
Between Groups	.408	2	.204	1.220	.303
Within Groups	8.522	51	.167		
Total	8.930	53			
Practices					
Between Groups	.014	2	.007	.062	.940
Within Groups	5.874	51	.115		
Total	**5.888**	**53**			

4.6. Relationship between the Teachers' Competence in their Knowledge, Attitude, and Practices on OBE in Mathematics Instruction

Table 10 displays the correlation coefficients of the Mathematics teachers' competence on their knowledge, attitude, and practices on Outcomes Based Education. Pearson's r coefficient correlation reveals a positive relationship between the respondent's knowledge and attitude (r=0.502), knowledge and practices (r=0.430), as well as attitude and practices (r=0.311).

The relationship between the competence of the Mathematics teachers ranges from medium or moderate to large or strong degree. The p – values of 0.000, 0.001, and 0.022 respectively were less than the acceptable alpha level at .01 and .05 respectively. There was a significant relationship between the teachers' competence in their knowledge, attitude, and practices on OBE in Mathematics instruction. This implies that as the level of competence of the teachers in knowledge on OBE

changes, the status of their attitude and the extent of the practices in the implementation of outcomes – based education also changes.

There was a positive relationship between the variables involved which also indicates that there's a direct proportion on the changes of the values involved in the variables of the study. Teachers' competence on OBE in terms of their knowledge, attitude, and practices were interrelated and affect to a certain extent, this relates to each other in determining the competence of the teachers.

The index of determination between the respondent's knowledge and attitude (r^2=0.2520) indicates that 25.20% of the variation in the points fall within the regression line. While the index of determination between the knowledge and practices (r^2=0.1849), shows that 18.49% is the ability to predict an outcome in the linear regression setting. Lastly, the index of determination between attitude and practices (r^2=0.0967) demonstrate that 9.67% is predictable in the variation as an outcome.

This result of the study was supported with the findings of the research conducted by Laguador and Dotong (2014), they found out that there was a significant correlation in terms of knowledge and practice on OBE implementation among the faculty members in the College of Engineering of Lyceum of the Philippines University. Faculty members with high level of knowledge and understanding on the implementation of OBE have also higher possibility to contribute in the realization of the objectives of OBE through practice. Woolfolk (2010) also states that knowledge is necessary for effective teaching because being more knowledgeable helps teachers be clearer and more organized in the process.

In addition, Manginsay (1998) found out that there was a significant relationship among teaching competence, professionalism and teaching management. The teachers have just come up to the standard in terms of competence, professional qualities and management learning. Teaching competence, professionalism and teaching management of the teachers are interrelated and affect to a certain extent.

Table 10: Pearson's r Results Showing the Significance of Relationships between the Teachers' Competence in Their Knowledge, Attitude, and Practices on OBE in Mathematics Instruction

Variables		Knowledge	Attitude	Practices
Knowledge				
	Pearson's Correlation (r)	1		
	Index of Determination (r^2)			
	p-value (2-tailed)			
	N	54		
Attitude				
	Pearson's Correlation (r)	.502**	1	
	Index of Determination (r^2)	.2520		
	p-value (2-tailed)	.000		
	N	54	54	
Practices				
	Pearson's Correlation (r)	.430**	.311*	1
	Index of Determination (r^2)	.1849	.0967	
	p-value (2-tailed)	.001	.022	
	N	54	54	54

*Note: * sig at p< .05, ** sig at p< .01*

5. CONCLUSIONS

The teachers lack the opportunity in participating seminars and trainings on OBE, as verified by the researcher through conducting an interview with the respondents, since there was no memorandum or invitation being received by them. Attendance of Mathematics teachers on seminars and training was minimal. The number of years of teaching experience by the faculty members indicates that most of the teachers were employed during the early period of the 20th century.

Moreover, the competence of the teachers on OBE in terms of knowledge, attitude, and practices in Mathematics instruction were incomparable when grouped according to age and number of years in professional teaching experience. Regardless of age and teaching experience, all faculty members were having equal opportunities in their competence on OBE.

Attendance to seminars and training which are OBE related has a bearing on the competency level of knowledge and attitude of the Mathematics teachers. The higher the level of competence on the knowledge of the teachers, the more positive is their attitude, and the greater their practices on outcomes–based education thus relationship is directly proportional. Implementation of the proposed intervention program is highly recommended.

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